



Proud to Be Here, Proud to Serve

# U.S. Army Accessions Command

First Handshake to First Unit of Assignment



## USAAC Studies and Analysis Program

Fiscal Year 2003 and 2004 Study Plan

for USAAC Research Consortium

LTC Stephen McCarty, Studies Program Director

27- 29 January 2004

An Army of One

# **Purpose**

Provide an update of the  
U.S. Army Accessions  
Command's Study Program  
and Present the Command's  
Study Program Plan for Fiscal  
Year 2004

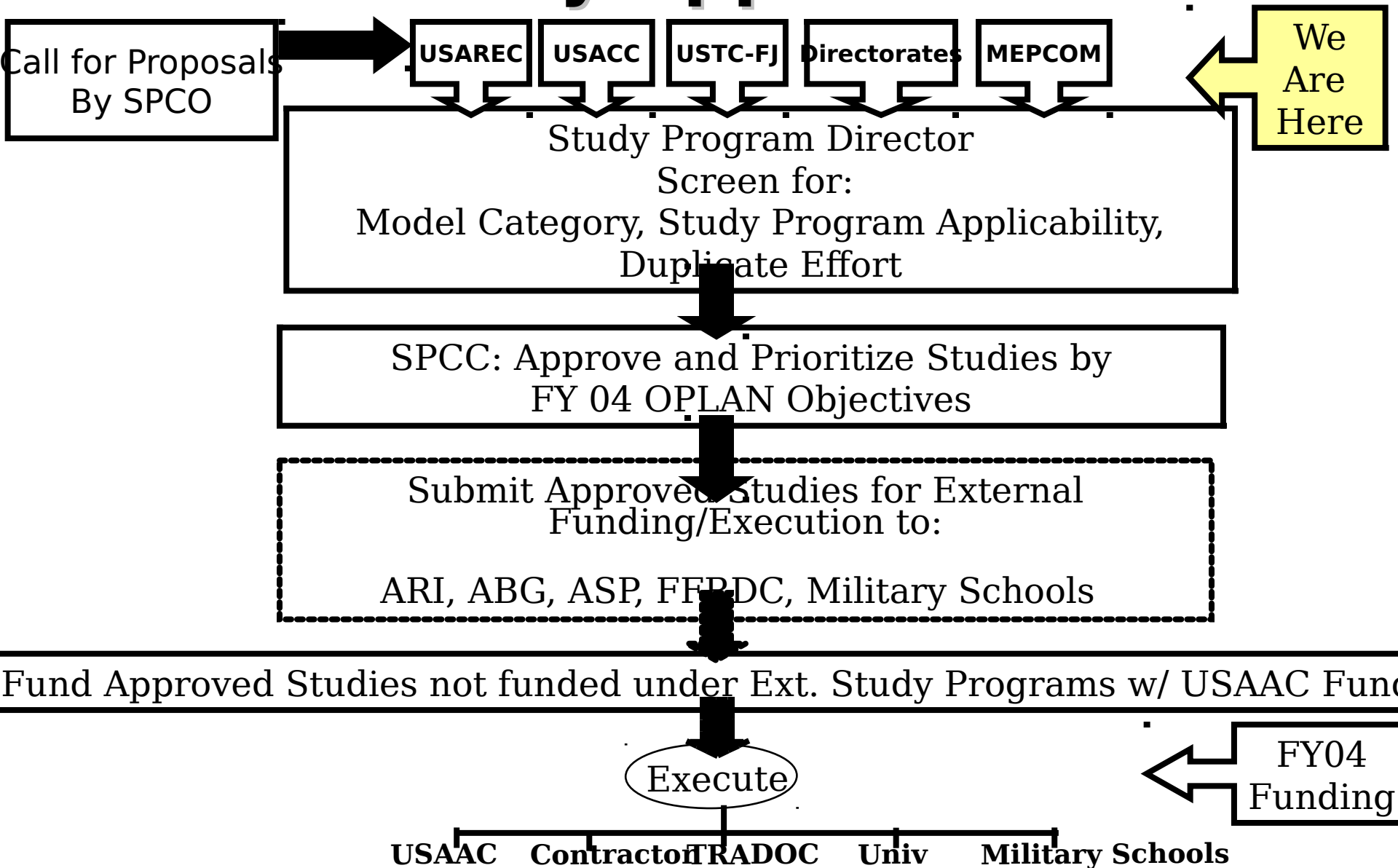
# Agenda

- ★ Azimuth Check
- ★ Prioritization Process
  - Screening and Selection Criteria
- ★ Summary External Studies
- ★ Summary of Army Brand Group's FY 04 Study Plan
- ★ Summary of Recurring Surveys
- ★ Summary of studies in USAAC FY 03 Plan
- ★ Summary of studies in USAAC FY 04 Plan
- ★ Summary of Human Dimensions FOC FY 04 Plan
- ★ Questions

# Where We Are

- ★ Studies Regulation USAAC 5-1 signed October 2003
- ★ Call for Proposals Tasker signed and sent to subordinate commands 20 January 2004
- ★ This is the the second meeting of Accessions Research Consortium
- ★ Assessing gaps and preparing for submittal to External Agencies' Study Programs
- ★ Meeting of GO Review Panel and SPCC is scheduled for April and May 2004

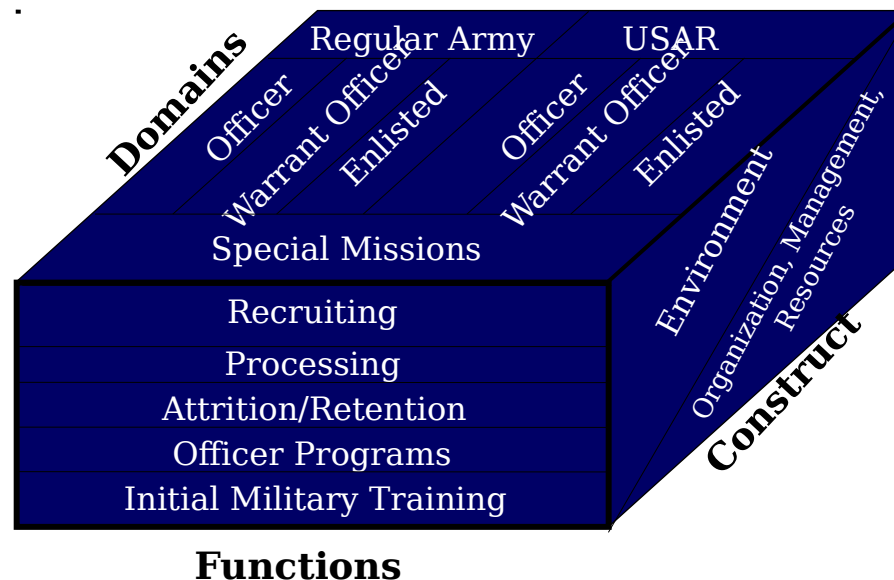
# USAAC Study Approval Process



# USAAC Studies Program Model (Used for Screening)

\* The purpose of the USAAC Study Program is to provide the right people (decision makers) with the right information at the right time and place to make fact-based decisions.

□ The USAAC Study Program provides an important mechanism through which problems pertaining to critical issues and other important matters are identified and explored to meet USAAC and Ar .



# **FY04 OPLAN Operational Priorities (Used for Screening and Prioritization)**

- 1.** Recruit representative Americans who are mentally and physically motivated to complete POI
- 2.** Conduct effective Initial Military Training that produces disciplined, physically ready, competent soldiers who can contribute to unit mission upon arrival
- 3.** Ensure standards are valid, clear, consistent, and enforced
- 4.** Transform the accession process by developing enabling processes, POIs and programs:
  - USATC-FJ (FFS BCT, Drill Sergeant School pilot)
  - USACC (BOLC I - III)
  - USAREC (Recruiter Cadre POI, GC Redesign, and Point of Sale)
- 5.** Connect with America through nationwide recruiter presence, event support, and ad campaign
- 6.** Develop tools to ID recruiters and cadre with required SKA and equip them with the tools, aids and incentives to achieve all objectives and goals

# External Study Requests Approved

BCT Customer Satisfaction Study	ARI
NCO Leadership Skills Inventory (NLSI)	RAND
Academic Discipline Mix (ADM)	RAND
Physical, Mental, Moral Disqual	OSD
Recruiting Leading Economic Index	OSD



# ABG Proposed Prioritization / **Max Plan (Below the Line)**

## On-Going Measurement

- (4) MCA Tracker - GCM
  - (6) MBAACM Tracker
  - (9) TNS HCM Tracker
  - (10) MB GCM Tracker
  - (30) Post-War Pulse GCM
  - (32) Post War Pulse Infl GCM
  - (34) PR I to I Tracker GCM
- 
- (10) MCA - Influencers
  - (17) Post-War Pulse AACM
  - (22) Post War Pulse HCM

## Creative Development

- (11) RA, USAR TV, Print Qual I HCM
  - (16) RA, USAR TV Copy Quant AACM
  - (19) Integ Web Series Concept Qual
  - (20) RA, USAR TV, Print Qual AACM
  - (23) RA, USAR TV Copy Quant GCM
  - (24) 2400/7AdEval Pod 3
  - (25) Integ Web Series Copy Qual
  - (26) RA, USAR TV Copy Quant HCM
  - (27) RA, USAR TV, Print Qual GCM
  - (29) Planning for Life Concepts
  - (31) Web Usability Qual
  - (33) AMEDD Print Concepts Qual
- 
- (11) RA, USAR TV, Print Qual II HCM
  - (13) Innovative Media/Message Qual
  - (21) DRTV Qual HCM (max budget)
  - (26) RA, USAR TV Copy Quant (05 Wk)
  - (27) RA, AR Print Quant GCM
  - (31) Special Forces Copy Qual AACM
  - (32) RA, USAR TV Copy Quant II HCM
  - (33) Integ Web Series AdEval (04 Wk)
  - (34) Special Forces Copy Qual GCM
  - (35) Olympic TV/Print Qual
  - (37) On-line Ad Messaging Qual

## Target/Strat Exploration

- (1) Influencer Quant AACM
  - (3) Reserve - Prior Service, ETS, and return from Middle East
  - (5) AA ROTC Explore Qual
  - (7) Influencer Quant GCM
  - (8) Influencer Quant HCM
  - (12) Nurses, Doctors Qual
  - (14) College Mkt+SAL Qual HCM
  - (15) College Mkt+SAL Qual AACM
  - (17) Web Re-architecture Qual
  - (18) Soldier Panels AACM
  - (21) College Mkt+SAL Qual GCM
  - (22) Soldier Panels HCM
  - (28) Soldier Panels GCM
- 
- (1) DEP Motivation Study
  - (2) Spec Forces Qual GCM
  - (4) YA Qual HCM Wave I
  - (5) Pre-Prospect Qual AACM
  - (6) YA Qual AA Wave I I
  - (8) YA Qual GCM Wave I
  - (9) Pre-Prospect Qual HCM
  - (12) Pre-Prospect Qual GCM
  - (14) Recruiters Attitude Study
  - (15) YA Qual GCM Wave II
  - (16) Influencer Qual Wave II AACM
  - (18) Influencer Qual Wave II HCM
  - (20) Spec Forces Qual AACM
  - (23) Civilian Clergy Qual
  - (24) Influencer Qual Wave II GCM
  - (28) API Prospect Qual
  - (29) API Prospect Quant
  - (30) API Influencer Qual

## Over-Archiving Learning

- (2) Brand Summit Strategic Comm Position Quant
  - (13) Services Image/Equity Research
- 
- (3) Discrete Choice Model
  - (7) Military Service Decision Process
  - (19) AACM Media Efficacy
  - (25) Web Lifecycle
  - (36) Caller preference for live operator or IPR

## Legend

- \* Titles link to quad charts
- \* Priorities: Above and Below the Line are ranked independently by weighted evaluation criteria.
- \* **Below Red Line** = projects we can not get to with current level of resources (Staffing, funding)

Note: All studies prospect focused unless otherwise indicated

# **USAAC Recurring Surveys**

**New Recruit Survey**

**USAAC, CAR**

**On-Campus Market Potential Study**

**USACC**

**Teenage Research Unlimited**

**USACC**

**Student Monitor**

**USAAC, CAR**

# FY03 USAAC Studies In Progress

Study Title	Provider
In-depth Probing of African American Male (HS & College) Attitudes about ROTC & Combat Arms	Contract with Hampton University
Enlistment Accession End-to-End Optimization Process Phase I	MIPR to NPS
Scholarship Questionnaire Validation	Contract to McIntyre Consultants
Recruiter Allocation and Assignment Model	MIPR to USMA
Pre-enlistment Physical Fitness Entrance Screening	MIPR to CHPPM
Highly Sought Academic Discipline Study	Contracted to McFrado-Curtis
Prior Service Market Analysis	MIPR to PNNL.
Parent Study	Contracted to KEI Pearson, Inc.
Compendium of Accessions Research 1992-2002	Contracted to Intrep Data, Inc.

# FY 04 Study Plan

Research Project	Sponsor
End-to-End Process, Ph II	USAAC-CAR
Optimal Monthly “In and For” and Entry DEP Inventory Based on Economic Factors	USAREC-PAE
Leads Prioritization Model	USAAC-CAR
Enlisted Options Conjoint Analysis Study	USAREC-G3
Chat Room Data Mining Effort and Follow-on PS Analysis	USAAC-CAR
Impact of Physical, Behavioral, and Moral Disqualification of Prime Market Population	USAAC-SPG
Army ROTC Scholarship Optiomization	USACC

# **Human Engineering FY04**

## **STOs**

**Selection, Classification, Performance Metrics for the Objective Force.**

**Biomedical Design Criteria for Helicopter Auditory Displays.**

**Body Armor Blunt Trauma Assessment.**

**Crew integration and Automation Test bed**

**Fatigue Intervention and Recovery Model (FIRM).**

**Head Support Mass (HSM): Warfighter Health and Performance.**

**High-Altitude Warfighter Altitude Readiness Strategies (HWARS).**

**Interventions to Enhance Psych Resilience & Prevent Psychiatric Casualties.**

**Lightweight Soldier.**

**Opt of Visual Perf with Optical and Electro-Optical Systems and Materials.**

**Phys Trng Interventions Enh Military Task Perf & Reduce Musculoskeletal Inj.**

**Tech for Human-Robotic Interaction (HRI) in Soldier-Robot Teaming.**

**Warrior Systems Modeling Technology.**



**Questions?**

**Chief, RISD**

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# BACKUP SLIDES

## New Recruit Survey

### **Objective**

- ★ Administered to recruits still living at home within their first 30-60 days after contracting
- ★ The survey focuses on understanding the key influencers and barriers for the target market
- ★ The survey is the only tool for quantitative look at our sold market

### **Application**

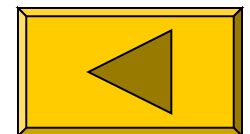
- ★ Answers major questions of why an individual joined, how they heard about us, who influenced their decision, and feedback on the recruiter contact and processing experience

### **Screening/Selection Criteria**

- ★ Model: Enlisted Recruiting/Environment/Resources
- ★ FY 04 OPLAN:(1) Recruit Americans/(5) Connect w/ America
- ★ Cost: Yes
- ★ Program App:

### **Recommendation**

- ★ Approve





## On-Campus Market Potential Survey

### Objective

- ★ Sample survey of college students to determine understanding and attitudes about Army ROTC
- ★ On-Campus survey, intercept method
- ★ Instrument developed within command
- ★ 2001 and 2002 surveyed 7600 students
- ★ An additional 52 schools to be surveyed in 2004

### Application

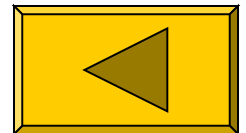
- ★ Information will be used to augment existing analysis to more correctly mission to true markets

### Screening/Selection Criteria

- ★ Model: Off Recruit Environment
- ★ FY 04 OPLAN: (1) Recruit SAL/(5) Connect w/ America
- ★ Cost: Yes if done w/ in-house source
- ★ Program App: No, Recurring Survey

### Recommendation

- ★ Approve



## Teenage Research Unlimited (TRU)

### Objective

- ★ Continue to track interest in Army ROTC and Enlistment into the Army focusing on 16-19 year old college bound youth
- ★ Data base provides the opportunity to correlate propensity to other behaviors and interests to support marketing objectives.

### Application

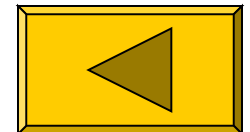
- ★ Waves are analyzed and combined and variations and trends are briefed

### Screening/Selection Criteria

- ★ Model: Global  
Recruitment  
Resources/IMT/Environment
- ★ FY 04 OPLAN:(1)  
Recruit Americans/(5)  
Connect w/ America
- ★ Cost: Yes
- ★ Program App:No,  
Recurring Market Survey

### Recommendation

- ★ Approve



# CAR & USACC

## Student Monitor

### **Objective**

- ★ Ask questions on 100 clustered Campuses across America to gauge college students
- ★ USAREC and USACC have proprietary questions in two waves (Fall and Spring)

### **Application**

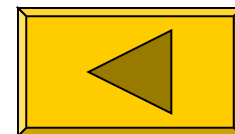
- ★ Used to develop Intel Estimate and the State of Youth Mkt Analysis

### **Screening/Selection Criteria**

- ★ Model: Officer and Enlisted Recruiting/Environment/Resources
- ★ FY 04 OPLAN:(1) Recruit Americans/(5) Connect w. America
- ★ Cost: Yes
- ★ Program App: Recurring Survey

### **Recommendation**

- ★ Approve



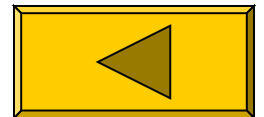
# In-Depth Probing of African-American Male (HS & College) Attitudes About Army ROTC and Combat Arms

## **Objective**

- ★ African-American males continue to commission at lower rates than African-American females and are least likely of all minority males to choose combat arms branches
- ★ Determine strategy to make an Officer Career and Combat Arms Appealing to African-American Males
- ★ Use of small focus group that is intended to generate new information about motivation and background beyond what surveys have provided

## **Application**

- ★ The information will be used to augment survey research and change how the command recruits
- ★ Uncover any previously unknown information



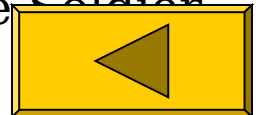
# Army Accessions End-to-End Optimization Process

## Objective

- ★ The US Army does not have a model that represents the entire officer and enlisted accession process to address requirements for the Objective Force Soldier design
- ★ This study will examine the interaction between recruiting, retention, training, and personnel with the Objective Force Soldier design and the future implications
- ★ The study will provide the best methodology to model and optimize the officer and enlisted accession process for the US Army and US Army Reserve

## Application

- ★ Determine critical paths and critical nodes during the accession process
- ★ Determine redundant tasks
- ★ Provide the best methodology to access the Objective Force Soldier and Officer



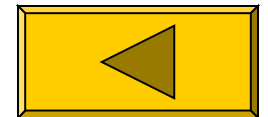
# Scholarship Questionnaire Validation

## Objective

- ★ Validate the scholarship questionnaire to determine the predictive qualities and what adjustments may be needed to adapt the questionnaire as a screening instrument.
- ★ The loss rate for Four-Year Scholarships is unacceptably high. The greatest loss comes between the MS1 and MS2 years. The existing research points to the selection process as the problem. A scholarship questionnaire has been developed for use with the PMS interview.
- ★ Determine the validity of the questionnaire in predicting retention of scholarship winners through standardized procedures.

## Application

- ★ The validation will demonstrate the power of the instrument to predict retention, and potentially be used to modify the content of the instrument to enhance predictiveness.



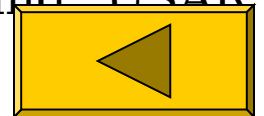
# Optimization Model for Recruiter Allocation and Mission Assignment

## Objective

- ★ Recruiting Command currently uses a multi-criteria decision model that assigns appropriate weights (utility) to six key variables
- ★ The research will help maximize productivity by developing a model that efficiently allocates both RA and USAR recruiters among existing and prospective stations. It will also be useful for goaling and policy analysis
- ★ Using an efficient mix of web-based information distribution and desktop GIS data analysis techniques to optimize the placement and allocation of recruiters and mission distribution by category for both USAR and RA

## Application

- ★ Analyst will construct a station level programming model that allocates RA and USAR production subject to user inputs such as variable territory definition polygons for leads allocation and trade area definitions for recruiter strength allocation
- ★ the model will be used to optimally allocate RA and USAR recruiters. Model will be able to predict recruiter output



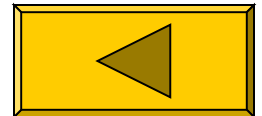
# Pre-enlistment Physical Fitness Entrance Screening

## **Objective**

- ★ Unlike the Canadian Army, the US Army has no Pre-enlistment Physical Fitness Entrance Screen (PPFES)
- ★ This study endeavors to establish a PPFES
- ★ The analyst would examine the current physical fitness level of the youth recruiting market to include racial and gender demographics, validate the requirement for entry physical fitness given the Army's current and proposed standardized BCT physical training program, and estimate the screening and training effect of instituting varying PPFES policies

## **Application**

- ★ Determine efficacy of Pre-enlistment Physical Fitness Entrance Screening
- ★ Determine effect on youth recruiting market of executing PPFES





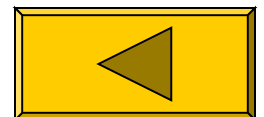
## Highly Sought Academic Discipline Study

### **Objective**

- ★ Determine what motivators and barriers exist among specific academic disciplines, e.g., engineering, physics, chemistry, mathematics, nursing, and other sciences with high math requirements.
- ★ Among those are engineers, nurses, physical science majors, computer science majors and other technical skills that the Army needs for future warfighting.
- ★ By conducting interviews of college sophomores and juniors with highly desired majors, determine what motivators and barriers exist among specific academic disciplines, e.g., engineering, physics, chemistry, mathematics, nursing, and other sciences with high math requirements. The following schools would be invited to allow participation: Georgia Tech, Purdue, Rose-Hulman, Kent State, Tulane, Cal Poly and West Virginia.

### **Application**

- ★ The information will be used to tailor a marketing approach on those campuses with significant markets in highly sought academic disciplines



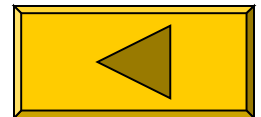
## Prior Service Market Analysis

### Objective

- ★ Understand individuals who are eligible to leave the active component and to join the USAR
- ★ Gain key information on the prior service market to make informed marketing decisions.
- ★ Apply advanced data mining techniques to sift through large databases to uncover patterns that will enable understanding of this market

### Application

- ★ Results are to be used by the Prior Service Planning and Strategy Group to improve targeting and marketing efforts for USAR



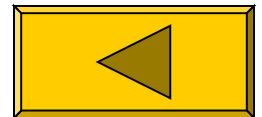
## Parents Study

### Objective

- ☀ Determine the parental knowledge levels about the Army and their influence on their children's decisions
- ☀ Existing research shows that parental influence is a significant factor in the decisions of their children to join the Army as an Enlisted or Commissioned Soldier. What is not known is the quality and sources of information that parents have to advise their children or what information is needed to assist in this process
- ☀ Conduct intercept surveys of parents in various locations about the Army and Army ROTC Program. Total sampling should be around 1200, from at least three, but no more than six locations

### Application

- ☀ The information will be used to tailor information to parents, and determine the most effective and cost-efficient methods



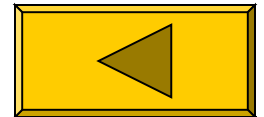
# Compendium of Accessions Research 1992-2002

## Objective

- ★ A Compendium of Accessions Research is needed to provide strategic input into the studies program by providing a comprehensive list of research that has been conducted over the past 10 years
- ★ Capture the breadth of Accessions related research conducted by various agencies
- ★ Researcher will query all applicable sources to develop comprehensive list of topics related to the recruiting/accessions process to include bibliographic data, abstract, location, and web links when available.

## Application

- ★ Research will provide a point of reference for all study proposals and research studies already in progress to preclude duplication of effort, therefore saving study dollars for new research.



# Army Accession End-to-End Optimization Process Phase II

## Objective

**\*In FY04 NPS will develop process models to examine the interaction between recruiting, retention, training, and personnel assignment policies with the Future Force Soldier design and the future implications of that design; the project will produce four descriptive models and one interactive simulation (RA Enlisted)**

**□ This study will expand the NPS effort to complete the remaining three simulations including Regular Army Officer, Reserve Officer, and Reserve Enlisted**

### Application

□ Three interactive simulations will be used to understand critical paths and bottlenecks in the holistic Accessions process and will provide analytical

underpinning for agent

### Screening/Selection Criteria

\* Model: Enlisted & Officer all functions and the whole Construct

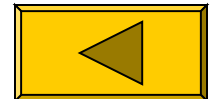
□ FY04 OPLAN:(4)  
Transform the Accessions Process/(6) Develop tools to achieve goals

□ Cost: Yes

□ Program App: Yes

### Recommendation

□ Approve



## Optimal Monthly “In and For” and Entry DEP Inventory Based on Econometrics

- \* **Develop a model to determine the optimal level of the EDEP**
  - ▢ **Objectively measure and optimally determine the size of the EDEP to mitigate the two challenges faced by the USAREC Leadership: EDEP size is now subjectively determined; historically, the recruiters’ workload created by recruits who sign contracts and ship the same month has not been measured**
  - ▢ **The methodology will use a model to determine the optimum “In and For” requirement and optimal EDEP size. This model will account for Recruiting Command’s emphasis on the graduate market, specifically high-graduates and the size of the Command’s Delayed Entry Program (DEP) pool**

### **Application**

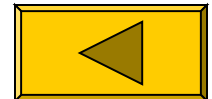
- ▢ Objectively measure and optimally determine the size of the EDEP

### **Screening/Selection Criteria**

- ▢ Model: Enlistment Recruitment Resources/Management
- ▢ FY04 OPLAN:(4) Transform the Accessions Process
- ▢ Cost:Yes
- ▢ Program App: Yes, Duplicate: No

### **Recommendation**

- ▢ Approve



## Enlisted Options Conjoint Analysis Study (Combined 4 Proposals)

### Objective

**\* Enlisted Bonus Distribution Model (EBDM) to determine the new probabilities of each respondent's preference for Military Occupational Specialties (\$100K)**

**▢ Impact of a Variable Enlistment Length (VEL) to determine appealing to the market and/or provide a competitive edge over other branches of service with standard enlistment contracts (\$100K)**

**▢ Removal of the Individual Ready Reserve (IRR) to determine impact on propensity to enlist for the prime market (\$100K)**

**▢ 15 Month Term of Service to determine impact on the prime market (\$85K)**

### **Application**

**▢ Determine the right mix of Bonuses and TOS options to the prime market given possible Congressional and DoD changes to traditional offerings**

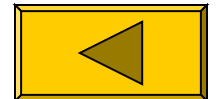
### **Screening/Selection Criteria**

- ▢ Model:** Enlisted Recruit Management Resources
- ▢ FY04 OPLAN:** (1) Recruit representative Americans/(6) Equip recruiters w/tools to achieve goals
- ▢ Cost:** Yes
- ▢ Program App:** Yes

**Duplicate:** No

### **Recommendation**

**▢ Approve**



# Leads Data Mining Project

## Objective

- \* **A model that routinely provides, for each discrete individual, the frequency at which each becomes a lead, every lead and lead source, the sequence and time interval between each lead, with lead source identified, and geo/psycho/demographic data for each person**
  - **Combine resultant data from above with statistical techniques to forecast the likelihood that each person in leads database will access**
  - **Provide the resultant information to the recruiter**

## Application

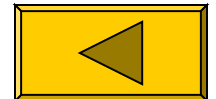
- The data mining effort will be used to better prioritize leads and to gain insight into the value of lead sources

## Screening/Selection Criteria

- **Model:** Enlistment Recruit Management
- **FY04 OPLAN:**(6) Develop Tools to equip recruiters with tools to achieve objectives
- **Cost:**Yes
- **Program App:**Yes
- **Duplicate:**No

## Recommendati on

- Approve





# Chat Room Data Mining and Phase II of Prior Service Analysis

## Objective

**\* Although the chat room has done an excellent job in capturing some measures of effectiveness, there is no current way to determine what the highest volume topics of interest are for the day/week/month**

**□ Chat room provides an untapped wealth of data on prospect priorities**

**□ Also provides possible insights on attitudes towards war**

**□ Leverage that information towards our marketing strategy**

**□ Finish Phase IV and V of the Prior Service Analysis with PNNL**

## **Application**

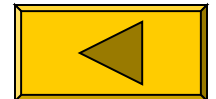
□ Using data mining techniques, determine what overall attitudes and concerns of visitor to the chat room were before, during, and after Operation Iraqi freedom and what

## **Screening/Selection Criteria**

- Model: Enlisted Recruiting/Environment
- FY04 OPLAN:(1) Recruit Americans/(4) Connect w. America
- Cost: Yes
- Program App: Yes
- Duplicate: No

## **Recommendation**

□ Approve



# Impact of Behavioral, Physical and Moral Disqualification on Prime Market

## Population Objective

**\* The size of the behaviorally, physically and morally disqualified segment and the corresponding impact upon the recruitable population has not been fully quantified**

**□ Extensive literature survey of Army and DoD studies and regulations as well as all professional medical/demographic research**

### Application

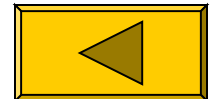
□ From the analysis better understand the extent of this growing problem and develop recommendation to mitigate the problem

### Screening/Selection Criteria

- Model: Enlisted Recruiting/Environment
- FY04 OPLAN: (1) Recruit representative Americans who can complete POI
- Cost: Yes
- Program App: Yes
- Duplicate: No

### Recommendation

□ Approve



# Army ROTC Scholarship Optimization Study

## Objective

- \* **Optimize Army scholarship allocation to increase number of ADM3 and ADM4 commissions without negatively impacting quality, quantity, and ethnicity mix**
- \* **Determine extent scholarship allocation optimization will impact overall quality of commissions**
- **Determine if additional funding is required to attract and Retain ADM 3s and ADM 4s and better meet the Army's needs**

### Application

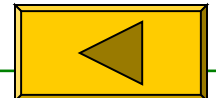
- Determine interaction of ADM, quality/cost of University, competition, ethnicity, recruitment, retention & scholarship funding

### Screening/Selection Criteria

- \* Model: Off Recruit on campus
- FY04 OPLAN:(1) Recruit SAL/(6) Equip Cadre w/ Incentives
- Cost: Yes
- Program App: Mkt Rsch
- Duplicate: No

### Recommendation

- Approve



## **Selection, Classification, and Performance Metrics for the Objective Force**

This STO will develop and test methods for identifying knowledge, skills, and attributes (KSAs) needed for effective future performance and validating predictor measures needed for selecting and classifying soldiers in 2008 and beyond. By FY02, identify common demands for future Army initial entry jobs (TRL 3). By FY03, identify selected future demands for two job groups and KSAs needed to effectively perform future jobs in these groups (TRL 3). KSAs will include those linked to Army-wide demands as well as those unique to these groupings. By FY04, identify and develop predictors and measures of future performance (TRL 4). By FY05, link predictors and performance measures and provide recommendations for future enlisted selection and classification (TRL 5).

*Supports:* DCSPER, TRADOC, USASMA, SMA.

<b>Funding (\$K)</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>
62785/790	1370	1417	1519	1591	----	----

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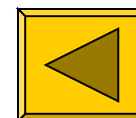
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## ***Biomedical Design Criteria for Helicopter Auditory Displays***

New auditory display technologies have not been tested in subject populations with sensorineural hearing loss. Neither have these displays been tested in noisy environments typical of Army rotary-wing aircraft and other military vehicles. Research suggests that auditory displays scheduled for deployment in Army rotary-wing aircraft will not be perceived correctly by aircrew members whose auditory end-organs have been damaged by exposure to intense noise. The purpose of this research effort will be (1) to evaluate new auditory display technologies [virtual (3-D) auditory displays and auditory icons] for use by hearing-impaired listeners in noisy environments and (2) to provide developers of these technologies with medically-based design criteria to ensure effective display use by Army aviators operating in noisy environments. The objective of this program is to enhance the safety and operational mission capabilities of future Army warfighters, regardless of hearing profile, using improved auditory displays. By FY02, evaluate sound localization using new auditory display technologies with standard and insert-transducer hearing protective devices (TRL 3). By FY03, characterize the effects of stimulus uncertainty and hearing profile on free-field and virtual auditory localization (TRL 5). By FY04, describe the operational utility of auditory icons in rotary-wing aircrew having various hearing profiles. By FY05, complete studies of speech communication using 3-D auditory displays in soldiers with sensorineural hearing loss. By FY06, summarize ability of hearing-impaired soldiers to use virtual auditory displays for speech and non-speech signals, and produce external peer reviewed, medically-based auditory display guidelines for Army warfighters regardless of hearing profile (TRL 6).

*Supports:* AR 97-004 Mounted Target Acq & ID, AD 97-013 Live Virtual Battlefield, AV 97-001 Commo, AV 97-007 Surv, AV 97-004 Cognitive Decision Aids/Crewmember Associate, AV 97-011 Aviation Battle Cmd, AV 97-012 Airspace Management, BCL 97-005 Info Presentation, TR 97-048 Performance Support Systems, TR 97-054 Virtual Reality (VR).

<b>Funding (\$K)</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>
62787/879	700	730	780	830	870		
Total	700	730	780	830	870		

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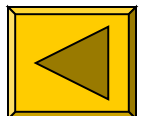
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## ***Body Armor Blunt Trauma Assessment***

Body armor developers do not have biomedically-valid injury risk criteria or testing methods to determine if the body armor they develop will prevent significant blunt trauma injuries. As a consequence, future body armor systems may protect warfighters from penetrating injuries, yet allow serious or lethal blunt trauma injuries. The current NIJ Standard 0101.04 Entitled "Ballistic Resistance of Personal Body Armor" defines the testing procedure for the evaluation of soft and hard body armor. The acceptable threshold for preventing life-threatening blunt trauma injury is 44-millimeter (1.73 inches) backface depression in plastilina clay. This standard, based on research performed more than 20 years ago, has been challenged as to its validity for soft body armor and has never been validated for high velocity projectiles impacting hard ceramic armor plates which is the primary threat faced by US military forces. This STO will produce biomedically-valid injury risk criteria and a testing methodology capable of estimating the risk of behind body armor blunt trauma injury. By FY02, develop approved animal protocol, develop and test impact measuring device, determine forces behind soft body armor (SBA), develop porcine finite element model (FEM) (TRL 2). By FY03, develop and test SBA impactor, conduct animal studies with SBA impactor, validate porcine FEM, develop corresponding human FEM, develop anthropomorphic test module (ATM), determine forces behind hard body armor (HBA). By FY04, develop and test HBA impactor, conduct animal studies with HBA impactor, use FEM to scale animal model, develop body armor blunt trauma software (TRL 4). By FY05, validate ATM with animal testing for SBA and HBA as required for transition to Natick Soldier Center (NSC) (TRL 6).

*Supports:* TR97-044, Survivability Personnel; TR97-026 Deployability; TR97-029, Sustainment.

<b>Funding (\$K)</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>
62787/878	750	750	750	250
Total	750	750	750	250

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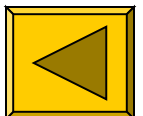
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### **III.GC.1999.02 Crew Integration and Automation Testbed (CAT) ATD**

The purpose of the Crew integration and Automation Testbed (CAT) Advanced Technology Demonstrator (ATD) is to demonstrate the crew interfaces, automation, and integration technologies required to operate and support future combat vehicles. The Crew integration and Automation Testbed (CAT) ATD will consist of two identical advanced-technology crew stations, along with a safety driver crew station, integrated into a C-130 transportable vehicle. The CAT ATD will leverage research investments from the Rotorcraft Pilot's Associate and Crewman's Associate ATDs. There will be an evaluation of alternative positions of crew stations using both front to back and side by side positioning. The goals are to demonstrate efficient use of manpower for 3 key battlefield tasks i.e. 100% of fight (19K), scout (19D), & carrier (11M) crew tasks, a 10x increase in architecture performance, as well as a 250K SLOC increase in software reuse. Specific technologies to be integrated include: helmet-mounted displays, head trackers, panoramic displays, intelligent driving decision aids, semi-autonomous driving technology suite, automated route planning, object oriented software backplane, and a combat vehicle graphics map toolkit. MANPRINT issues will be addressed through human factors modeling and analysis early on and through soldier and system performance measurement during experimentation. The Current capability is unique crew stations for each vehicle variant (TRL 3). FY00/01: complete workload analysis and develop baseline semi-autonomous driving, route planning aids. FY02: adapt and develop mission planning and rehearsal cognitive decision aids. FY03, adapt and implement embedded training and complete development of driving aids and decision aids. Demonstrate technologies in laboratory at TRL 5. FY04: develop on-the-move battlefield visualization technologies, incorporate advanced displays and perform Battle Lab Warfighter Experiments at Ft. Knox at TRL 6.

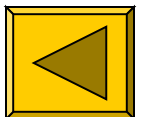
*Supports:* Future Combat System, UGV, Open Systems Joint Task Force, Joint Technical Architecture-Army, WSTAWG

<b>Funding (\$K)</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>
62601/H91	895	822	1305	1733	1500		
62716/H70-ARL	730	926	844	862	880		
63005/497		2916	5567	6235	5866		
Total	1625	4664	7716	8830	8246		

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# ***Fatigue Intervention and Recovery Model (FIRM)***

There are no valid predictive models to help war planners estimate degradation of soldier effectiveness during CONOPS/SUSOPS, or the effects of various fatigue countermeasures to restore and sustain performance. The current sleep/performance model is only an unproven concept based on a two-process model of sleep recovery that quantifies the combined effects of sleep debt status and circadian phase on laboratory-based performance measures. This STO will create a valid military planning tool, FIRM (Fatigue Intervention and Recovery Model) by that corrects three current model deficiencies (a) inability to predict post-mission recovery rates needed for warfighter recycling; (b) undefined variability in responses to sleep loss; (c) inadequate quantification of the efficacy of fatigue countermeasures in sleep deprived soldiers. The STO will also leverage other program efforts to link laboratory measures of performance to militarily-relevant task and mission accomplishment. In FY04, recovery rates following acute sleep deprivation vs. chronic sleep restriction will be determined/modeled. In FY05, the effects of escalating doses of fatigue countermeasures will be determined/modeled. In FY06, FIRM v.1 will be produced, predicting recovery, variability, and countermeasures effects in the lab. In FY07, field studies will be conducted to validate model predictions for militarily-relevant performance. In FY08, FIRM v.2 will be produced, incorporating soldier characteristics as moderators of military performance (TRL 5).

Supports: FOCs: 13-1, 11-03

## **Funding (\$K)**

62787/879

63002/800

## **FY04**

200

900

## **FY05**

200

1000

## **FY06**

0

1500

## **FY07**

0

2000

## **FY08**

0

1800

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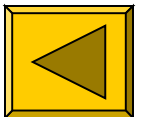
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***Status FY04: Proposed  
New***

Reason for change \_\_\_\_\_

Approved by \_\_\_\_\_





## **IV.ME.2001.01    *Head-Supported Mass (HSM): Warfighter Health and Performance***

The Army is dependent on head-supported devices (HSDs), ranging from basic ballistic and impact protective helmets to advanced weapon sighting and communication systems. These devices increase the amount of weight supported by the soldier's head/neck, and usually shift the center of head-supported mass (HSM) upward or forward, placing the user at risk of acute and chronic neck injury and degraded warfighter performance. Medical and safety personnel do not have validated guidelines to help assess problems with fielded systems, and sufficient data do not exist for Army materiel developers. This STO enables the informed and safe use of current and future HSDs. This research will produce an integrated model incorporating HSD design criteria, operational guidelines, and health risk criteria that will minimize performance degradation and reduce the risk of injury. In FY01, completed retrospective epidemiological studies of neck injury in operational environments (TRL 3). By FY02, characterize the HSM-related mechanical stresses of operational environments (TRL 4). By FY03, establish HSM neck injury thresholds and performance criteria (TRL 4). By FY04, complete predictive models for neck injury and human performance with varying HSM (TRL 5). By FY05, transition integrated model of design and health risk criteria to customers (TRL 6).

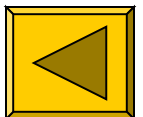
*Supports:* TR 97-023 Mobility-Combat Dismounted, TR 97-002 Mobility-Combat Mounted.

<b>Funding (\$K)</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>
62787/878	1243	1371	1334	1190	972
Total	1243	1371	1334	1190	972

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01**

# ***High-Altitude Warfighter Altitude Readiness Strategies (HWARS)***

Mountainous terrains provide sanctuary for hostile forces. This harsh environment lessens US military superiority by limiting use of air support and crew-served vehicles, thereby placing a greater combat burden on dismounted warfighters. OFW emphasizes rapid deployment, mobility and sustained operations without re-supply. However, rapid deployment of unacclimatized troops to high mountainous terrains causes debilitating effects on fighting capabilities and force health. All unacclimatized troops experience marked decreases in physical work and cognitive performance at elevations above 1500 m. Between 2000 to 4000 m, the incidence of Acute Mountain Sickness (AMS) in unacclimatized soldiers rapidly increases from ~20% to ~70%. During a major Afghanistan combat operation, ~12% of medevacs and hospital admissions were due to severe AMS. Altitude acclimatization effectively decreases susceptibility to AMS and improves work performance.

However, acclimatization can take 6-14 days of continuous exposure to high altitude. In lieu of acclimatization, available medications that reduce AMS also impair work performance and have other adverse responses. This STO will utilize advances in the understanding of altitude acclimatization, AMS pathophysiology and modeling, to increase warfighter work performance capabilities and decrease AMS susceptibility during rapid deployments to high mountainous terrains. By 2005, identify performance enhancing nutritional supplements for incorporation into altitude rations (TRL 4). By 2006, develop pre-deployment doctrine to time compress altitude acclimatization (TRL 4). By 2007, develop prediction models of altitude acclimatization, illness incidence and work performance (TRL 4). By 2008, integrate technological components into prototype Altitude Readiness Management System (TRL 5).

Supports: FOCs: 13-01, 11-03

## **Funding (\$K)**

62787/879

**TOTAL**

## **FY04**

1600

**1600**

## **FY05**

1660

**1660**

## **FY06**

1700

**1700**

## **FY07**

1740

**1740**

## **FY08**

1800

**1800**

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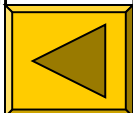
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***Status FY04: Proposed New***



# ***Interventions to Enhance Psychological Resilience and Prevent Psychiatric Casualties***

Over one third of enlisted soldiers fail to complete their first term of enlistment, most often due to mental, psychosocial, and behavioral problems. Over 7% of the entire force received outpatient treatment for a mental disorder each year, with over one quarter of these military personnel leaving military service within six months (vs. 9% overall). These problems exist on a continuum that ranges from degraded performance, such as impaired adaptability and reduced cognitive function, to psychiatric casualties. Such problems can have a critical impact on the ability of soldiers and small units to respond effectively to mission demands. Transformation initiatives to the Objective Force are predicted to increase the impact of these problems on mission effectiveness. Resilience is a broad concept related to the ability to prepare for, adapt to, and recover from psychological challenges. This STO will provide knowledge and interventions to sustain performance, prevent behavioral dysfunction and psychiatric casualties. There is a joint effort between USAMRU-E, forward-deployed in USAREUR, and Division of Neuropsychiatry, WRAIR. USAREUR provides an ideal research environment, as a microcosm of the Army with frequent operational deployments; WRAIR is ideally capable of linking epidemiological data from USAMRU-E with DoD personnel and medical records. By FY03, develop and validate tool to assess cognitive function in the field; develop a suicide surveillance system for Army-wide use. By FY04, identify factors that predict high rates of mental disorders and define the association of mental health with readiness (e.g., attrition rates). By FY05, develop effective methods for psychological health screening in deployed troops. By FY06, field test strategies such as psychological debriefing (e.g., following traumatic events) to reduce psychiatric morbidity in soldiers. By FY07, develop criteria for identifying vulnerable soldiers in training and operational environments. By FY08, develop strategies to prevent stress- and psychiatric-related performance degradation. By FY09, provide military-wide implementation of assessment and intervention tools to improve resiliency, warfighter health, and mission performance.

Supports: FOCs, MD97-009 Combat Stress Control, MD97-007 Preventive Medicine, and TR97-048 Performance Support Systems

<b>Funding (\$K)</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>FY09</b>
62787/879	1900	2000	2200	2400	2400	2250	2000
63002/819	0	0	0	0	0	500	850
<b>Total</b>	<b>1900</b>	<b>2000</b>	<b>2200</b>	<b>2400</b>	<b>2400</b>	<b>2750</b>	<b>2850</b>

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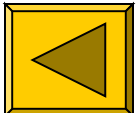
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## IV.SP.1999.01

# Lightweight Soldier

This program defines the advanced soldier system architecture for the Objective Force timeframe with the ultimate goal of making future infantry systems as lightweight as possible—50 pounds (23 kg) fighting load versus the current 75 pounds (34 kg). This STO will develop and apply decision and prototyping tools to assess soldier system concepts and technologies, and will be responsible for ensuring that technologies and components being developed by other agencies are well coordinated and focused on the soldier system architecture for the Objective Force. It will also refine nanotechnologies and develop novel, commercial manufacturing technologies for application to the Objective Force Soldier System. Early assessments indicate that nanotechnology offers the best opportunity for significant weight and bulk reduction (25-50 percent) through integration of capabilities at the submicroscopic level.

In FY00, validated existing soldier system models using Land Warrior system baseline data. By the end of FY01, perform laboratory-scale evaluations of nanotechnology composites, which will be exploited for use in the Objective Force architecture (TRL 2). By the end of FY02, produce prototype nanotechnology components and demonstrate a virtual prototyping tool to include cognitive engineering (TRL 3). The models and virtual prototyping technologies will be used to evaluate candidate Objective Force components, including components from CECOM, ARDEC, DARPA, ARL, and other RDECs, in terms of technical capabilities and effects on human performance, and will be made available to participating agencies. By the end of FY03, verify performance of nanotechnology composites (TRL 4) and define the architecture for the Lightweight Soldier System for transition to a 6.3 joint PM-supported STA/ATD starting in 2004. This architecture will define the future system capabilities and integration required for the 50-pound (23 kg), low-power soldier system for the Objective Force.

*Supports:* DBBL, Infantry School, Armor School, Objective Force Warrior Program, Air and Mounted Warrior upgrades.

<b>Funding (\$K)</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>		
PE 62786/H98	3000	5413	3.7502	5.6600	7.3500	6.600	3.50
Total	3000	5413	7512	6600	3500		

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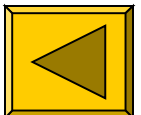
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## **IV.ME.2000.01 Optimization of Visual Performance with Optical and Electro-Optical Systems and Materials**

The Army is equipping its soldiers and its vehicles with advanced imaging and display technologies to solve battlefield problems such as degraded fighting environments (e.g., low illuminance, smoke, fog) and directed energy, chemical, and biological weapons. Inadequate bioengineering testing and evaluation to assure a match with human characteristics frequently leads to fielded nonmedical systems which exhibit degraded performance. This STO will produce improved image output standards to optimize visual performance with advanced electro-optical designs and visual performance models to predict soldier performance in an operational environment. In FY00, developed test design for evaluating Integrated Helmet and Display Site System (IHADSS) imagery in the field; developed display assessment for shades-of-gray model for Head-Mounted Displays (HMDs) in an operational environment. In FY01, investigated visual performance issues relating to binocular/biocular HMDs. By FY02, develop methods for assessing effects on performance of gray level perception in HMDs; determine compatibility tradeoffs of image intensification devices with color multifunction displays; develop spatiotemporal model of human contrast sensitivity. By FY03, develop performance criteria for the integration of flat panels into HMDs. By FY04, determine visual performance deficits with electro-optical devices relating to refractive correction methods; complete visual detection model to include complex targets and backgrounds(TRL 6).

*Supports:* TR 97-017 Information Display, TR 97-002 Situation Awareness, TR 97-056 Synthetic Environment

<b>Funding (\$K)</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>
62787 / 879	738	750	776	796	818		
Total	738	750	776	796	818		

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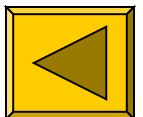
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**IV.ME.2003.  
05.**

## **Physical Training Interventions to Enhance Military Task Performance & Reduce Musculoskeletal Injuries**

Over half of the Army's tasks require muscular strength and endurance. There is no standardized approach to safely achieve and maintain optimal physical task performance. Injuries continue to impact soldier readiness, at an estimated cost to the Army of over \$100 M per year. Musculoskeletal complaints account for a large percent of soldier outpatient visits, and injury rates resulting from Basic Combat Training range from 23 to 67%. Many of these occupationally-related injuries may be related to inadequate strength fitness, over-training, or both. This STO will provide the Army with new science-based physical training and monitoring strategies to achieve the highest possible level of physical readiness while minimizing injury rates. These strategies and evaluation criteria will be used by the US Army Physical Fitness School to develop criteria for physical fitness and occupational performance evaluation products. By FY04, develop rapid train-up methods for soldiers, including new recruits and reserve soldiers, with emphasis on load carriage and lifting capabilities.

By FY05, devise alternatives to high running volume to maintain aerobic conditioning, while improving occupational performance and reducing over-training injuries. By FY06, investigate the role of resistance training in enhancing performance and reducing overall injury rates to establish a basis for recommendations on Army-wide resistance training. By FY07, provide a method to assess levels of physiological strain and develop guidance for use in predicting increased susceptibility to injury during training programs.

*Supports:* FOCs: TR 97-044 Survivability - Personnel; TR 97-026 Deployability; TR 97-029 Sustainment; AV 97-007 Survivability; TR 97-051 Training Infrastructure

<b>Funding (\$K)</b>	<b>FY03</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>
62787/879	800	950	900	1050	1050
63002/819	000	000	200	250	350
<b>Total \$5,550K</b>	<b>800</b>	<b>950</b>	<b>1100</b>	<b>1300</b>	<b>1400</b>

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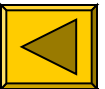
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mil



# **Technology for Human-Robot Interaction (HRI) in Soldier-Robot Teaming**

This joint effort STO will develop a common user interface that maximizes multi-functional soldier performance of primary mission tasks by minimizing required interactions and workload in the control of ground and air unmanned systems, minimizing unique training requirements. The HRI STO will develop advanced models, metrics, and design guidelines for optimal mounted and dismounted soldier-robotic performance (ARL lead), and employ this information to develop, integrate and demonstrate technology required for effective interaction with both air and ground unmanned battlefield systems (TARDEC lead). This STO will implement model-driven embedded intelligent agents that optimize soldier workload, reduce and/or automate controlling tasks, support adaptive and dynamic performance across mounted (embedded) and dismounted systems and enable efficient mixed-initiative operations, where manned and unmanned systems team to perform missions. The common interface will increase situational awareness and understanding and provide FCS mounted, dismounted and Objective Force Warrior (OFW) control for all unmanned assets. In FY04, this STO will develop common operational definitions with tri-Service and related programs (SRL=3) and conduct task and workflow analysis for control of unmanned systems (SRL=3). By FY05, it will delineate distinct mounted and dismounted user requirements for common unmanned systems control tasks (SRL=3), and establish a spiral baseline system engineering process for model, software and prototype development (TRL=5). In FY06, this STO will model: workload and performance for humans-in-automation issues and shared human-machine control (SRL=4) and begin software development of intelligent agents. It will initiate design for a common interface and integrate emerging results with ongoing experimentation in a SIL environment (SRL=5, TRL=6) and support OFW and FCS Unmanned Systems experiments. For FY07, this STO will model soldier-robot team performance, utilize metrics and diagnostics to determine optimal workload levels for selected operational contexts (SRL=4) and refine intelligent agent software (SRL=5). In FY08, it will finalize model and guideline maturation (SRL=5), intelligent agent workload reduction efforts and common interface work and merge into planned field exercises in militarily relevant environment for mounted/dismounted control of air/ground unmanned assets (SRL=5/6, TRL=6).

This STO will leverage technology and activities from FCS Increment I and OFW ATD, TARDEC's CAT and RF ATDs, ARL's Semi-Autonomous Robotics for FCS STO and CTA and the RDECOM's Robotics IPT and provide products to FCS Increment 2, OFW ATD, ART STO and Unmanned Autonomous Collaborative Operation STO. Users: UAMBL, DBBL and OFW ATD.

Supports: Future Combat Systems for mounted and dismounted unmanned system control and Objective Force Warrior.

<b>Funding (\$K)</b>	<b>FY04</b>	<b>FY05</b>	<b>FY06</b>	<b>FY07</b>	<b>FY08</b>	<b>TOTAL</b>
62716/H70 (ARL)	3866	3809	3900	3910	3854	19339
63005/D515 (TARDEC)	0	0	1955	3919	4906	10780
63005/D497 (TARDEC)	0	1368	7677	9722	13287	32054
<b>TOTAL</b>	<b>3866</b>	<b>5177</b>	<b>13532</b>	<b>17551</b>	<b>22047</b>	<b>62173</b>

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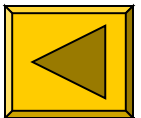
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**Status FY04: Proposed New**

Approved by \_\_\_\_\_



# **Warrior Systems Modeling Technology**

This joint STO will develop the essential analytic tools to evaluate and quantify the military worth of next generation Warrior Systems and future Lightweight Soldier initiatives. This is a key enabler of Simulation and Modeling for Acquisition, Requirements and Training (SMART). The tools will capture the demanding level of human performance representation required in the RDA domain while additionally furnishing the Requirements and Training domains with improved warrior representation. In FY00, developed required scenario vignettes that will appropriately exercise warrior systems and components. In FY01, provided algorithms, data model and vignettes to include both battlefield and restricted terrain, e.g. rooms, hallways, tunnels, trenches, etc., and other environmental features, e.g. lighting levels and dynamic weather to improve the range and accuracy of combat assessments (TRL 5). By the end of FY02, implement improved close combat/MOUT algorithms that have been validated with ground truth data provided by the Human Systems/Modeling & Analysis for Warrior Systems Program(TRL 5). By the end of FY03, demonstrate a 1st generation modeling capability to evaluate the combat worth of Warrior Systems in a close combat/MOUT environment (TRL 6). Validate Operational Requirement-based Casualty Assessment (ORCA) non-lethal sub-models and model extensions. By the end of FY04 demonstrate a verified and validated, High Level Architecture (HLA) compliant, modeling capability to evaluate the combat worth of Warrior Systems in approved critical Infantry squad battle drills and rifle platoon collective tasks (TRL 7). The model will additionally provide the capability to reduce program risk by 50% in the areas of prototype development, system down selection, concepts of deployment, and identified operations and support costs.

**Supports:** Lightweight Soldier, Objective Force Warrior System; DBBL, Infantry School, Training Research & Development

<b>Funding (\$K)</b>	<b>FY00</b>	<b>FY01</b>	<b>FY02</b>	<b>FY03</b>	<b>FY04</b>
62786/H98	1300	2315	2400	2250	1950
62716/H70	320	455	465	477	0
62618/H80	125	150	150	200	0
TotalL	1745	2920	3015	2927	1950

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